



# CRITICAL THINKING: DESCRIPTION, ANALYSIS AND EVALUATION

**Example 3: Engineering taken from results: “The Mechanism of Formation of Porous Calcite Composite Crystals Through Thermal Decomposition”**

## EXAMPLE

Each sample of crystals exposed to 200 °C for 720 mins failed to form pores, while all the samples formed pores after 30 mins at 300°C. As a result of this, the sample groups annealed at 200°C for 30 mins and 120 mins were not investigated, as it is unlikely that pores would form when exposed to this temperature at shorter timescales. The fact that pores did not form at 200 °C indicates that somewhere between 200 °C and 300 °C there is a thermal threshold, at which the temperature is sufficient to induce pore formation. Upon observation of sample P3C in the TEM, it was noticed that pores formed at a lower temperature; approximately 140 °C. It was hypothesised that this was due to the vacuous environment inside the TEM, and so to test this, a sample was placed in the vacuum oven at 140 °C for 30 mins (F) and 170 °C for 120 mins (W). High-res SEM revealed that no pores were present in P3CF, whereas a small number of pores could be seen in P3CW. This indicated that the mechanism by which the pores form involves a gaseous process, as the reduced pressure allows the gases involved in the formation of pores to evolve at a lower temperature.

**TUTOR COMMENTS FOLLOW ON PAGE 2**



**BROKEN DOWN EXAMPLE**

**COMMENTS**

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**Description:**

The student describes the result of their experiment.

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**Analysis:**

The student analyses the results and offers a possible explanation.

This indicated that the mechanism by which the pores form involves a gaseous process, as the reduced pressure allows the gases involved in the formation of pores to evolve at a lower temperature.

**Evaluation:**

They then explain the significance of their result.